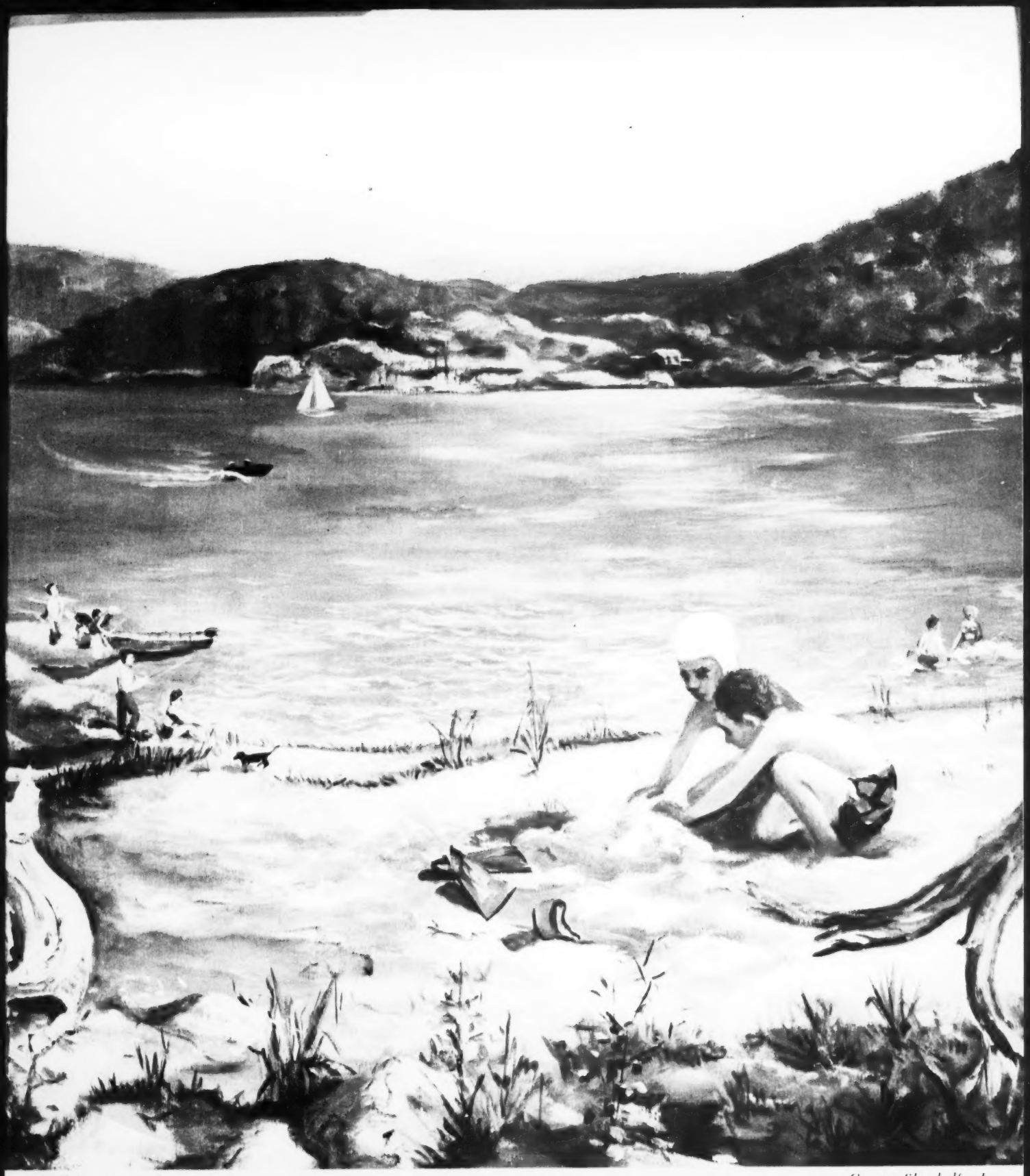

Hill Country Lake — *George Shackelford*

The Humble Way

JULY-AUGUST, 1955

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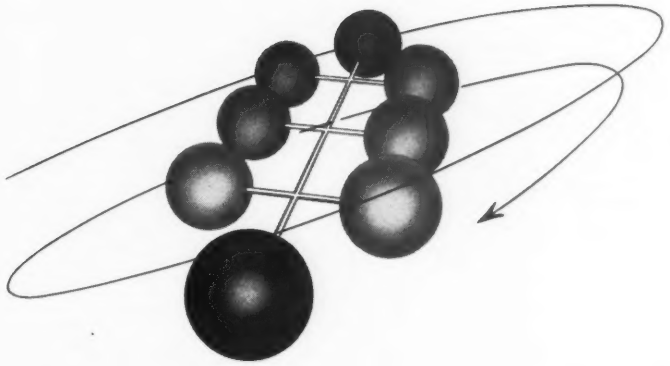
The Humble Way
July-August, 1955
Vol. XI No. 2



Bombarding the Hydrocarbon

Baytown scientists now work with a new form of energy in their attempt to coax still more wonders from the petroleum molecule

A SIGN on the door of a small, windowless, block-like building at Humble's Baytown Refinery reads: "Danger—Radiation."

That door is always locked. The key is held by only a handful of Humble's scientists and research workers. And the same men who hold the key to that door may also hold the key to vast new fields in petroleum refining.

For behind that door, protected by concrete walls three feet thick, these men are experimenting with a machine which produces a beam of artificial atomic radiation of extremely high energy. Such a beam can bring about basic changes in many substances which are subjected to its power, and these changes are of interest to scientists in many fields of research. Humble scientists at Baytown are, at present, interested mainly in what happens when the beam strikes a petroleum sample; more specifically, what happens to the hydrocarbon molecules which make up petroleum.

Here is a new form of energy to use in experimenting with hydrocarbons. Can this energy produce the same reactions as the energies of heat, pressure and chemicals now being used in refining? Or, to stir the imagination, can it produce reactions never before known?

The answers to these questions, when found, could conceivably lead to a number of significant developments —better yields of the more valuable products which are hidden in a barrel of crude oil, higher total yields of all products, highly improved products, perhaps even entirely new products.

The work inside the thick-walled building goes on quietly, deliberately. Yet even an outsider may detect the touch of drama which hovers about these men as they peer through a 12-inch thickness of a special protective glass to observe the beam striking a target. The safety devices add to the atmosphere—the gong which sounds when power is turned on, the radiation monitors which operate continuously, the shield of lead bricks stacked beneath the amber colored observation window.

All this the scientists are likely to describe simply as "bombarding the hydrocarbon."

The machine which produces the beam is a Van de Graaff Electrostatic Particle Accelerator. It bears the name of Robert J. Van de Graaff, a Massachusetts Institute of Technology physics professor who designed it. It is called an accelerator because it produces a supply of tiny particles of energy, accelerates them to fantastic speeds by the use of static electricity,

Skillful skier takes sharp turn on one of many Texas lakes which offer recreation for the entire family. (See story on pages 6-9.)

and fires them out in a concentrated stream, or beam.

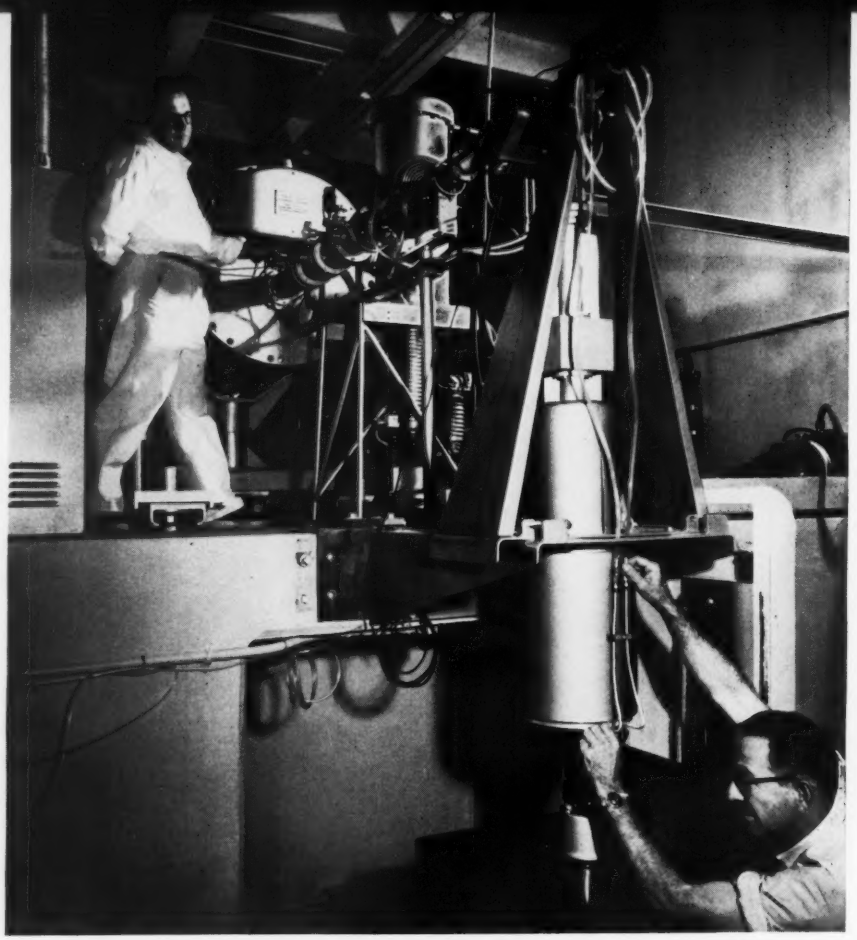
A brief look back into a few developments in nuclear science may best explain how such a beam is produced.

When scientists began probing into the atom, searching for a way to take its nucleus apart, they learned that the particles which made up that nucleus —protons and neutrons and other elemental particles—were held together by tremendous forces. It would, therefore, take tremendous energy to break the nucleus apart. So the idea was born to fire a "projectile" into an atom at a speed great enough to break up the nucleus.

But how to do it? It soon became plain that since the atom's system was so small, only the smallest of nature's "bullets" could be used. This meant an atomic particle, such as a neutron or an extremely high energy electron.

But still a method had to be found to aim and fire the projectile at the required speed. Scientists knew that radioactive substances in nature, such as radium and uranium, are sending out projectiles constantly. Though no one knows why, the atoms of these radioactive materials are forever exploding, throwing off atomic particles. These small atomic explosions were useful, but natural radioactive materials were rare and expensive and these sources were accordingly of limited utility.

The need, then, was to produce, artificially, and in a controllable beam, the particles which atoms give off in nature.



Humble's accelerator, now in use at Baytown. Many such machines are in existence. Some are used in medical therapy but most like Humble's, are used in research work.

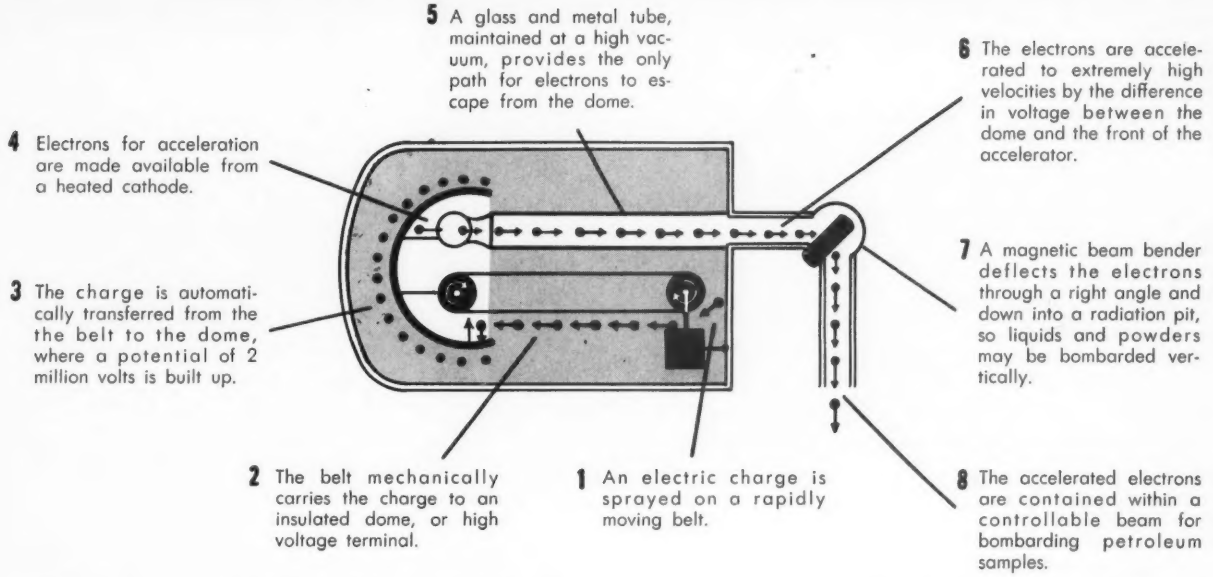
This was eventually done in several ways. Robert Van de Graaff's machine offered one solution to the problem of producing that beam, which Humble scientists are using at Baytown. Here's how it works:

An electric charge is sprayed, through a comb, onto an insulated belt revolving inside the shell of the accelerator (see schematic drawing). The belt carries the charge to the rear of the machine and deposits it onto a highly insulated dome, which acts as a storage point for large charges at very high voltage. As the belt keeps turning, more and more electricity is accumulated onto the dome until—in the case of Humble's accelerator—a potential of 2 million volts is built up.

Now atomic particles can be produced at will. An electron, for instance —the particle now being accelerated by Humble—can be produced from a cathode in a vacuum tube, as in a radio. A cathode inside Humble's accelerator furnishes a supply of electrons.

With the high voltage on the dome as the driving force, the electrons are given a series of powerful kicks through a tube running from the dome to the front of the accelerator. And when

In radiation pit, research workers line up a hydrocarbon sample to be bombarded. Flexible pipe is hooked to a system which exhausts gases when machine is operating.


5 A glass and metal tube, maintained at a high vacuum, provides the only path for electrons to escape from the dome.
6 The electrons are accelerated to extremely high velocities by the difference in voltage between the dome and the front of the accelerator.
4 Electrons for acceleration are made available from a heated cathode.
7 A magnetic beam bender deflects the electrons through a right angle and down into a radiation pit, so liquids and powders may be bombarded vertically.
3 The charge is automatically transferred from the the belt to the dome, where a potential of 2 million volts is built up.
2 The belt mechanically carries the charge to an insulated dome, or high voltage terminal.
1 An electric charge is sprayed on a rapidly moving belt.
8 The accelerated electrons are contained within a controllable beam for bombarding petroleum samples.

How accelerator works is explained in this simplified drawing, which shows the machine accelerating an electron beam used in the study of hydrocarbon reactions. It can be modified to accelerate still other particles or more value in analytical work.

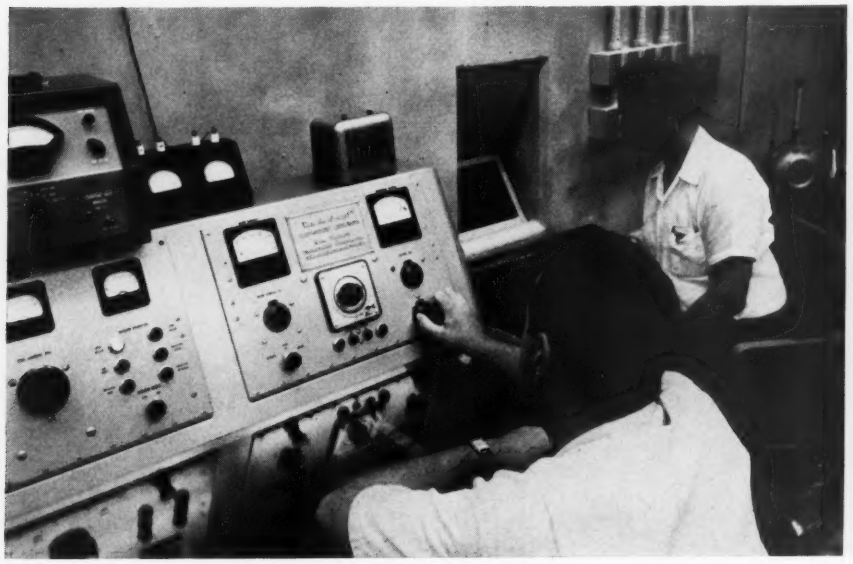
they come out the end of the tube, the particles are traveling at near the speed of light, which is 186,000 miles per second.

These electrons—tiny particles of negatively charged electricity—ram into a hydrocarbon sample with tremendous force and effect the changes which the Company's scientists are studying.

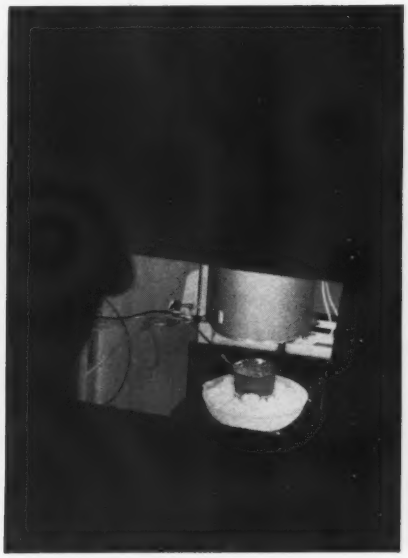
No, the beam does nothing so spectacular as splitting hydrogen or carbon atoms. It does not, in fact, explode the hydrocarbon molecule, which is surprisingly stable. But the force does "tickle" the molecule, often breaking some of the bonds which link its atoms together. And it is just such changes which must occur in refining, making possible the manufacture of a great variety of products from crude oil.

Working with the accelerator can scarcely be passed off lightly as a job with no risk at all. Without proper safety precautions and equipment, danger would be part of any refining research job. But the dangers are hardly those which the public so often associates with atomic research. No chain reaction is created. Nobody in the area is in danger of being blown to bits. The electron beam does not make a sample radioactive. Bombarded materials may be safely handled as soon as the machine is shut off.

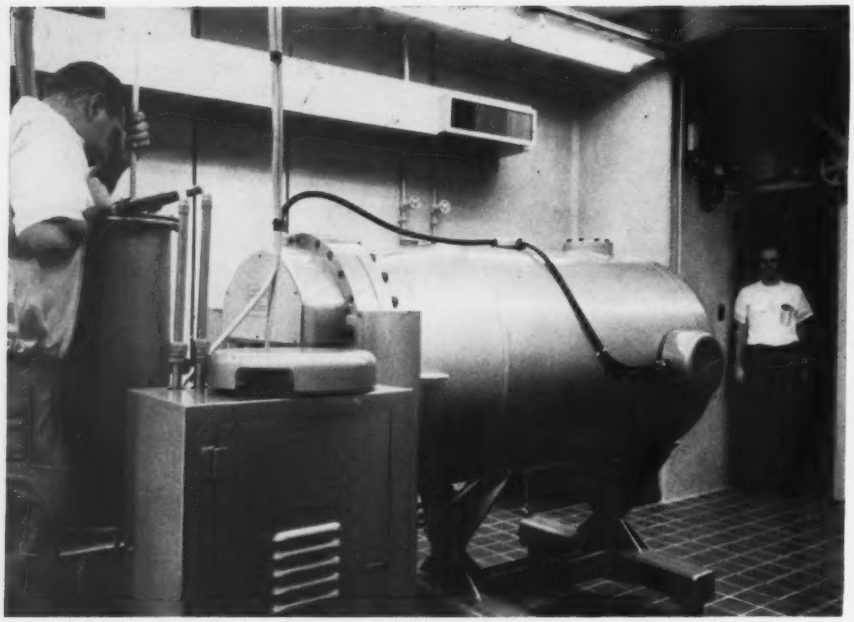
The chief danger is that when the beam strikes a target it produces stray radiation—that is, radiation not controlled in the beam. This radiation consists of X-rays which are quite deadly. Hence the thick, protective walls around the machine. But the



Controls of accelerator are in room adjoining radiation pit. Operations in the pit are watched (by scientist at right) through 12-inch thickness of protective glass.



As seen through window, bombarding beam appears to be harmless spotlight.



Servicing the accelerator, Humble scientist (left) packs dry ice into the machine's vacuum pump system while another enters two-ton lead door with a test instrument.

Construction scene shows thickness of walls around the radiation vault. Pipes and tubes in the walls were run through lead brick labyrinths for radiation protection.

X-rays stop when the machine stops, and workers can enter the room as soon as the belt inside the accelerator quits moving.

Still, elaborate safety precautions were installed in the building, which consists of two rooms. In one room are the accelerator and the radiation pit. In the other are a small laboratory and the controls of the accelerator.

There is potential danger as long as power is available to the accelerator, so a gong sounds continuously for 45 seconds when this power is applied, even though it may be minutes before the machine is turned on.

A two-ton lead door leads from the control room to the radiation vault. Another gong sounds when this door —operated by an electric motor—is opened or closed. A switch in the frame of the door, operating like the switch which controls the light in a refrigerator, guarantees that the accelerator won't be turned on while the door is open. As a double check, the same type switch is installed in a small gate which must be entered to reach the big door.

If in spite of these precautions a person were to be trapped inside the room, there's an escape tunnel through which he may scurry outside to safety.

Many Van de Graaff Accelerators have been made for various uses by industry. Humble's has one unique feature. It is equipped with a magnetic beam bender. The beam, traveling horizontally in the accelerator, is bent at right angles so that it travels straight down into the radiation pit. This permits the vertical bombardment of liquids and powders.

The accelerator is a versatile machine. It is accelerating electrons now because electrons are best suited for the present purpose—the study of reactions. Other particles can be accelerated—protons, for instance, which are positively charged. These and other particles which can be made available are better suited for analytical work.

The true significance of these experiments by Humble may not be known for years to come, for such is the way of fundamental research. Scientists believe there are many wonderful secrets still locked within the hydrocarbon molecule. But even they do not know what may be revealed by the humming machine behind that locked door at Baytown.

The Close Look

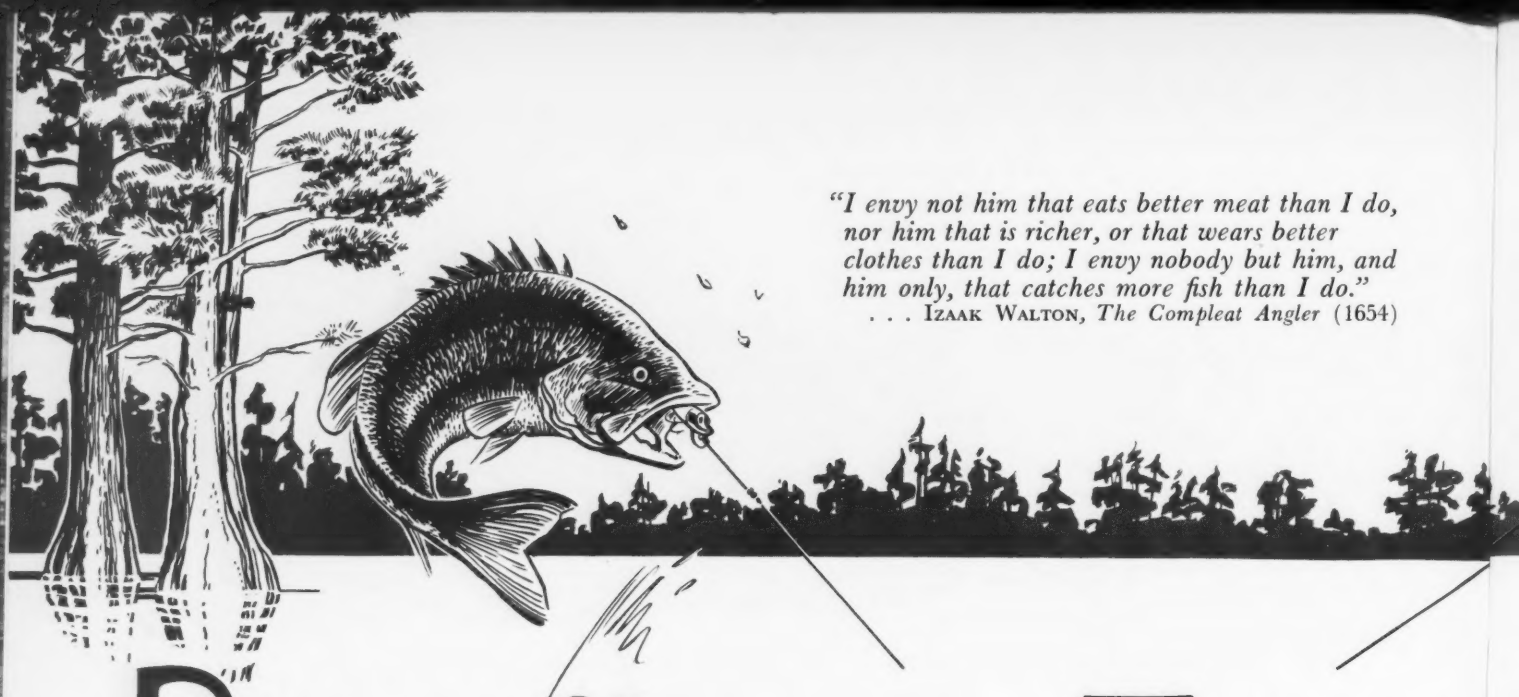
THE big picture being examined above by a Humble research scientist shows some particles of clay used in refining. Under the best optical microscope, these particles would hardly be visible. In this picture they are magnified one million times.

An electron microscope owned jointly by Humble and Rice Institute made this great magnification possible. Such a picture is called an electron photomicrograph, which is useful for detailed study of the physical structure of clays and catalysts of interest to oil scientists.

At left, a Rice Institute scientist sits at the viewing screen of the electron microscope. The instrument operates on the same principle as an ordinary optical microscope, except that magnetic fields are used in place of glass lenses and a beam of electrons traveling in a high vacuum replaces the usual beam of light.

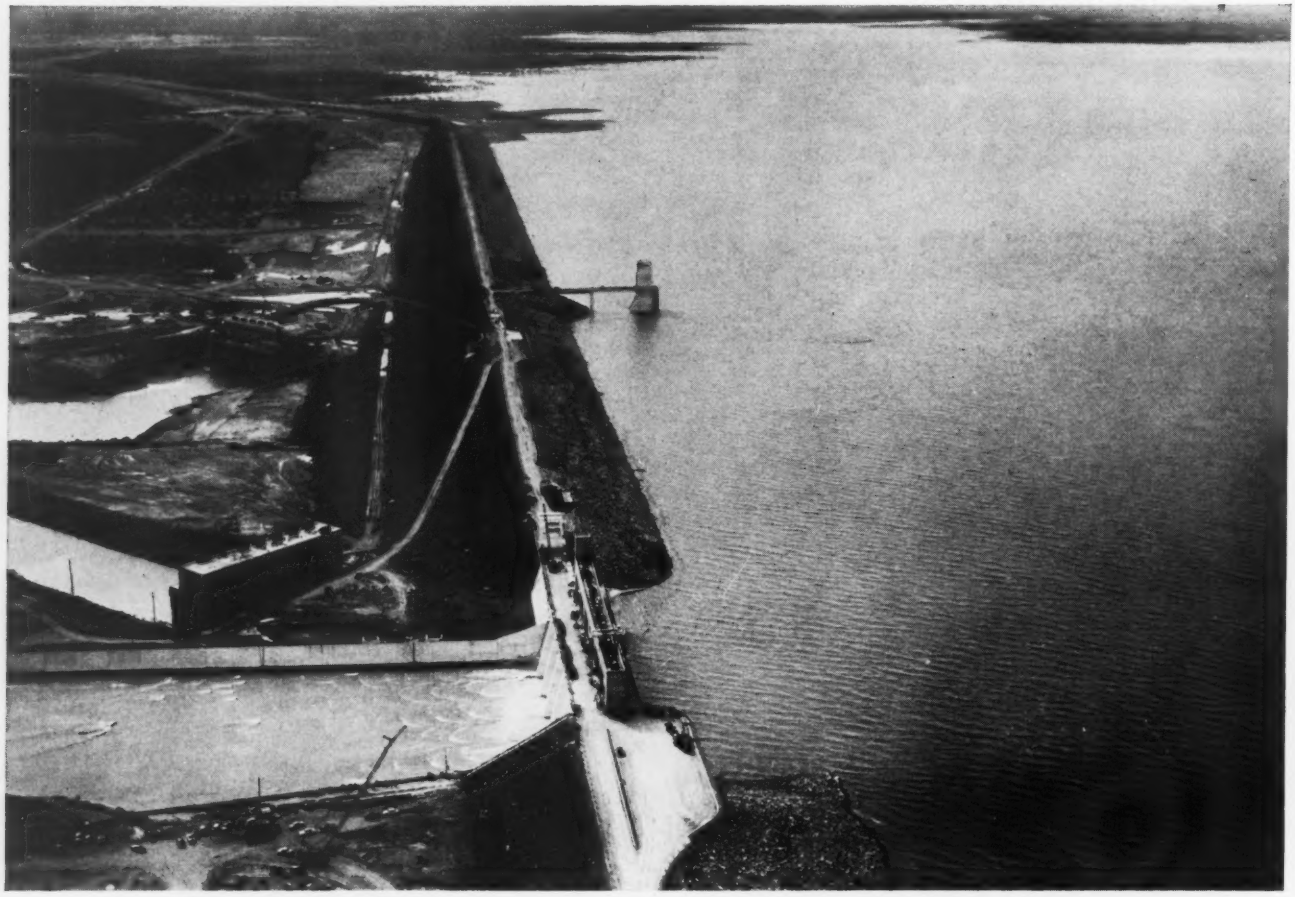
When a sample to be examined is placed in the beam, the electrons form an image of the substance and project it on a viewing screen. In this way, substances can be magnified up to 75,000 times, making possible the close study of their structures. (Optical microscopes can be made to magnify up to 4,000 times, but the resulting image is blurred and difficult to interpret.)

The clay sample in the big picture above—which hangs in the Research Building at Baytown Refinery—was first magnified 40,000 times in the electron microscope, then 25 more times with a photographic enlarger.



"I envy not him that eats better meat than I do, nor him that is richer, or that wears better clothes than I do; I envy nobody but him, and him only, that catches more fish than I do."
. . . IZAAK WALTON, *The Compleat Angler* (1654)

Recreation on Texas



ALONG THE BORDER between the United States and Mexico is Falcon Dam, completed on the Rio Grande in 1953 as a joint effort between the two countries. The resulting Falcon Lake, shown here, has a capacity of more than four million acre-feet of water. Beginning above Roma, it extends some 50 miles and varies from half a mile to five miles wide.

s Lakes

The state is now studded with water sports playgrounds

THERE is something of interest for the whole family on a Texas lake. Mom, as usual, may find few offers of help as she spreads out the picnic cloth and frantically shields her sandwiches from assaults by hungry small fry. The rest of the family is already out on the lake, enjoying their favorite water sports.

Sis, a fetching mermaid in her new bathing suit, has the bronzed young life-guard thinking in terms of moonlight cruises. Junior, more athletically than romantically inclined, bumps busily along on water skis behind his buddy's motorboat. And Dad, discreetly away from it all at the far end of the lake, probes the waters patiently with bits of steel and feathers, trying to lure that big lunker of a bass from his hiding place.

Multiply this family outing by thousands, and by as many week-ends and holidays as weather permits, and there's no doubt about it! Water sports *are* taking over in Texas. If it keeps up, the typical Texan will be in danger of losing his identity as a lean and dusty cowboy whose experience with water is limited to a cooling drink from a rangeland creek. Already, he is more likely to appear in a jaunty yachting cap instead of a wide-brimmed *sombrero,* riding the cockpit of a bouncing speedboat instead of the hurricane deck of a bucking *bronco.*

This does not suggest, of course, that everyone in Texas has moved down to the Gulf Coast. They don't have to, these days, to enjoy a wide variety of water sports. During the last couple of decades, dams and reservoirs built in Texas for power, flood control, and water supply have added millions of acre-feet of new fresh water. As it stands now, the length and breadth of Texas is so studded with lakes that few Texans are far from an inviting water sports playground. It is a change that has revised patterns of sports activities for thousands of people throughout the state.

Grandpa, though he would stoutly deny that he was underprivileged in his youth, lacked some of the fresh-water advantages offered his grandchildren. He had to rely mainly on rivers and "forks of the creek" for his swimming holes. And when he went fishing (with a can of worms and a cane pole), his catch would be confined, more often than not, to catfish or a string of perch.

It is still a subject for debate, but his grandchildren believe they have it better. Already, some of the more adventurous are graduating from the surface and its limitations and taking their sports thrills underwater. These are devotees

FAMILY CRUISE on Lake Brownwood, which furnishes water for the city of the same name. The lake has an area of 8,000 acres and has about 95 miles of shoreline. This is a popular recreation spot.

MAN-MADE LAKES known as the Highland Lakes, were formed above Austin when dams were built on the Colorado River. This one is Lake Austin. Others include Lake Travis, Inks Lake, and Buchanan Lake, largest of the group, which covers a 23,000 acre area.

HERE'S SPORT to warm the heart of any plug-casting bass fisherman. The scene is Lake Casa Blanca, near Laredo.

of such comparatively new lake sports as skin-diving and spear-fishing. When they do fall back on what they consider more prosaic pastimes, they equip themselves with the latest in glass or split-bamboo rods, with at least an alternate reel or two, and with fancy tackle boxes crammed full of weird-looking flies and plugs.

And they seek different prey from those that prowled the depths in Grandpa's day. Game fish in Texas lakes are more explosive and full of fight than the river fish Grandpa usually had to cope with. For good eating, of course, not even a purist among sports fishermen spurns a fresh-caught catfish fried in corn meal. But the really dedicated game fisherman is more interested in action than in culinary delights.

And he often gets more action than he bargains for! All he has to do is toss his plug in the right spot at the right time. First comes the heart-quickening boil of water as a large-mouth black bass churns angrily toward the lure. Then the explosive force of the strike! And finally, the struggle between man and fish as the hooked bass twists, dives, and leaps in efforts to throw the plug.

The ending is not always happy for the angler. But once his fish is in the net, the thrill of catching him is enough to make up for all the sunburn, mosquitoes, and back-lashes of the trip. This is fishing geared to the jet-propelled pace of modern living.

When it comes to fishing, Texas lakes are not, like one of Izaak Walton's placid trout streams, "the quietest and fittest place for contemplation." They buzz with activity. And here is why:

Fishing in Walton's day was called "the contemplative man's recreation," something reserved for those of the leisure class who had time to contemplate. Today, the 40-hour week and a level of average income which offers some recreation for all has put practically everyone into a modified version of the leisure class. Give any man a combination of money

A SPOT OF BEAUTY is this part of Caddo Lake, which lies partly in Louisiana. Generously shaded by tall cypress trees, Lake Caddo is said by the Indians to have been formed by an earthquake. It has an area of some 35,000 acres.

BOATING AT ITS BEST is represented by this scene taken on Lake Kemp, near the Vernon-Wichita Falls area. Kemp covers 22,000 acres.

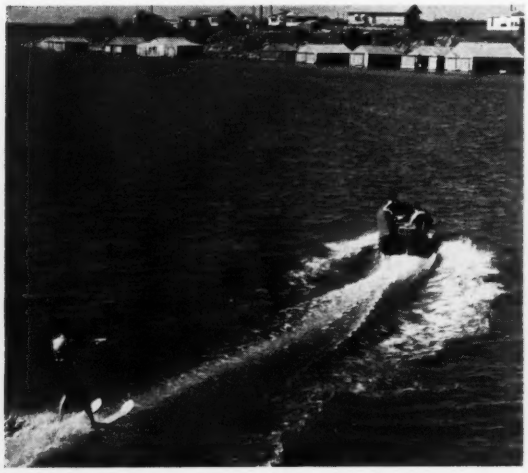
to spend, time off from work, and a nearby lake—and watch him go fishing!

One thing about fishermen—they haven't changed much since the days of "The Compleat Angler." They are still a dedicated breed of men, each with his own pet lures and his own theories about the best places to find the big ones. And each is blessed with that "large measure of hope and patience" which hallmarks all who master the art of angling.

Only three things *have* changed since Walton fished the streams and ponds that sparkled across the green breast of England. There are more fishermen, more places to fish, and more fish to catch. It is estimated that there are some *30 million* sports fishermen in the United States today. And anyone looking for a good fishing spot on a Texas lake during a week-end or holiday must surely surmise that a goodly number of those 30 million are concentrated in the Lone Star State. Certain it is that Texans spend their share of the estimated one billion dollars that American fishing enthusiasts pay out each year in pursuit of their elusive quarry.

The amazing part of it all, with so many fishermen beating lake waters to a froth, is that there are any fish left to catch. Yet, in spite of intensive fishing, there are more fresh water fish today than ever before. Part of the credit goes to a bountiful Nature, part of it to the millions of acre-feet of new water impounded, and part of it to tremendous programs of conservation, construction, stocking, and transplanting.

Thanks to a pleasant combination of these forces, few Texans return home these days with empty creels. Even when they do, if they be true fishermen, they do not count the day lost. Tomorrow will be better. Winds will shift or abate, waters will clear, and the cut of the moon will prove more favorable to their fortunes. That is the unfailing optimism which prevails among this fraternity of hopeful men. That is the siren, and often fulfilled, promise held out to all by the beckoning waters of a Texas lake.



THRILL-A-MINUTE sport enjoyed by younger and more venturesome Texans is water skiing, shown here in action. Hardly a Texas lake is without its devotees of this action-packed water sport.

SMALL FRY HAVE FUN on this stretch of sandy beach on Lake Texoma, which lies on the Red River between Texas and Oklahoma. Texoma, with 95,000 acres in all, has 26,000 of those acres in Texas, and offers a large area to suit the needs of all water sports enthusiasts. It is a favorite haunt of fishermen.

Seven glass-topped buses transported the field conference party on the 525-mile tour of the Four Corners Area. Guides on each bus described points of geologic interest along the route and the caravan made numerous stops for talks by expert geologists.

VISIT TO FOUR CORNERS

This is a land of rocks, where the history of the earth through many millions of years can be read by geologists

THEY call it *The Four Corners*—that lonely spot on the Navaho Indian Reservation where the boundaries of Utah, Colorado, Arizona, and New Mexico meet at a common point.

Surrounding it in a hundred-mile radius is a vast and rugged area of breath-taking natural beauty and startling contrasts. This is known as the Four Corners Country—a land of towering mountains and verdant valleys; of snow-cooled streams and hot deserts; of deep canyons and high mesas.

But mostly it is a land of rocks.

To a geologist the Four Corners area is indeed a happy hunting ground. For here he finds the multi-colored layers of ancient rocks laid bare for his inspection in the walls of canyons, atop craggy mountain peaks, and along the broken faces of gigantic uplifts. To his trained eye these rock formations tell a fascinating story—the history of the earth over a period of millions of years of geologic time. And hidden in that story are the clues that often lead to deposits of oil and gas, uranium, and other valuable minerals.

The Four Corners country is of particular interest to the petroleum industry because it is the center of three important overlapping sedimentary basins —the Paradox, the San Juan, and the Black Mesa. Several gas and oil fields have already been discovered in the tortured folds of these ancient sea beds, and no one doubts that there are more petroleum reserves yet to be found here. Dozens of oil companies have assigned field geologists to carry on continuous exploration in this area, and independent geologists have been attracted to the region like a cat to catnip. In fact, the Four Corners country seems to have a strong fascination for geologists in all parts of the nation.

This widespread interest was spotlighted recently when the Four Corners Geological Society staged its first Field Conference, a three-day tour of the Four Corners area starting and ending at Durango, Colorado. More than 200 geologists and other interested people showed up for the event. They came from 13 states and the District of Columbia, bringing their bedrolls, cameras, geologic picks, and an eager enthusiasm for what they were about to see and hear.

Field trips of this type are a regular

First stop on the tour was at this point near Durango, in the Animas River Valley. Rock strata visible here are part of the records of more than 500 million years of geologic time that lie exposed along canyon walls within a distance of 35 miles.

activity of most of the 40-odd regional geological societies scattered throughout the United States. Usually held on an annual basis, the geological field conference provides an excellent opportunity for geologists to see and discuss the significant geologic features of a specific area. The participants listen to talks by experts on local geology, argue the merits of various geologic theories, and profit by a general exchange of ideas.

The Four Corners Field Conference was a typical example. By the time the seven chartered sight-seeing buses got underway on the morning of June 15, most of the occupants had become acquainted and were already talking geology. The discussions were still going strong at the end of the third day, when the buses rolled back into town.

The route of the tour covered some 525 miles in Colorado, Utah, Arizona, and New Mexico; taking the conferees through parts of the three great sedimentary basins. The caravan moved smoothly over paved scenic highways, stirred up clouds of dust on little-used country roads, and struggled through drifted sand and rocky draws on lonely desert roads. And all the while well-

At Baker's Bridge, where the Animas River plunges through a gorge of solid granite, the tour party stopped to study an interesting outcropping of ancient quartzite.

This scenic view of Disappointment Valley in southwestern Colorado was enjoyed by members of the field conference party on the afternoon of the first day. As the buses wended their way into the valley the tour guides pointed out geologic features.

informed guides in each bus kept up a running description of the points of geologic interest.

At prearranged points of vantage the buses halted and everybody piled out to see something of special interest. At each such stop, an expert would talk about the local geology, using a public address system mounted in a car which accompanied the caravan. Camera shutters clicked incessantly as members of the party snapped pictures of everything in sight, and usually a number of the geologists could be found happily chipping away at the outcropped rocks with their hand picks.

Humble geologists, as did others, had need for a camp fire on Summit Point.

Meals for the traveling party were served in the open air by a contract caterer who somehow managed always to be at the right place at the right time with everything set up and waiting for the arrival of the hungry horde. Since there were no other sleeping accommodations available, the touring geologists pitched camp at nightfall and slept on the ground. One night they camped atop a 7,500-foot Colorado mountain; the other on the floor of the northern Arizona desert.

The First Day

The first day of the field conference was spent in the mountain country of southwestern Colorado. Starting at Durango, the party immediately witnessed one of the most unusual and interesting displays of geologic phenomena to be found anywhere in the world. Within a distance of 35 miles along the floor of the beautiful Animas River valley the highway passes through exposed rock sections that represent more than 500 million years of geologic time. Here the successive rock strata are laid open to view like the charts in a geology textbook.

Fourteen miles north of Durango the oldest of these rock layers comes to the surface at historic old Baker's Bridge. At this spot the massive blocks of solid granite form a narrow gorge through which the Animas River plunges in a raging torrent. It is an impressive scene that attracts sight-seers by the hundreds, and has been the setting for several motion pictures. But to the party of geologists who stopped here briefly on their field tour, the scenery was secondary in interest to the section of ancient quartzite which lay in contact with the granite near the river.

Later in the day—after lunching at the city park in Dolores, Colorado, to

Heading toward Utah after a lecture stop in Gypsum Valley, the field conference caravan passed through an interesting area of intensive uranium activity. Here the geologists became involved in lively discussions about how uranium was deposited.

music provided by the local school band—the party headed northwest over the great Colorado plateau. Passing through part of the San Juan National Forest, the buses wound their way down aspen-wooded slopes into beautiful Disappointment Valley, then moved out into Gypsum Valley and the uranium mining country. Here the square wooden stakes marking prospectors' claims could be seen on all sides, and the caravan began to meet numerous big trucks hauling uranium ore from the mines to the processing plants. Here, too, the geologists took sides in a spirited discussion about how the uranium deposits were laid down.

In late afternoon, the buses labored up the steep road to Summit Point, where the party pitched camp for the night nearly a mile and a half above sea level.

The Second Day

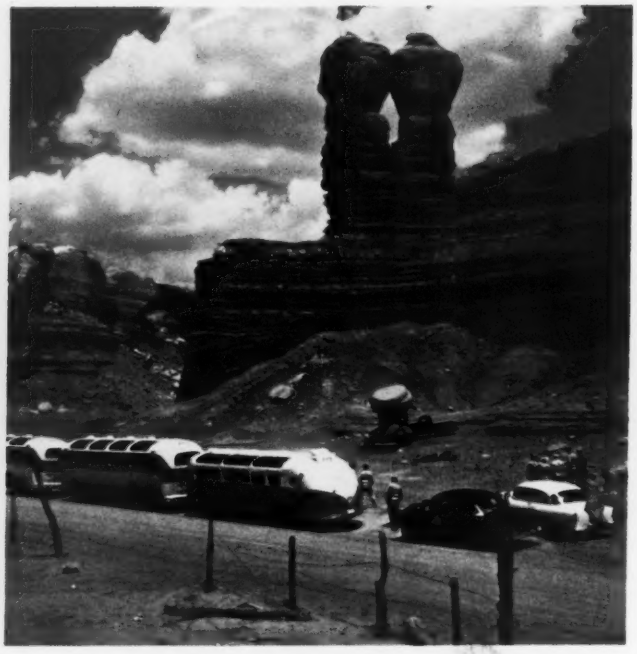
Most of the second day was spent in the more level, but none the less colorful, country of southeastern Utah. Traveling south from Monticello, the caravan soon sighted the familiar landmarks of the Bear's Ears mountain, the Sleeping Ute mountain, and Comb Ridge.

Coming into the San Juan River valley at Bluff, Utah, the buses wound their way through the same historic "hole in the rock" that the pioneer Mormon settlers used to lower their prairie wagons in 1879. Like all tourists who pass this way, the geologists stopped to marvel at the strange rock formation known as the "Navaho Twins." To the geologists, however, these interesting "kissing rocks" were described as "erosional remnants of Bluff sandstone, capping spires of the San Rafael group."

After lunch, which was eaten in a blowing sand storm atop a rugged barren slope known as Lime Ridge, the traveling geologists proceeded south past lofty red buttes to the intriguing "Goosenecks of the San Juan River." Here the river makes a series of hairpin turns and the visitor looks down into sheer canyon walls more than a thousand feet deep. The scheduled stop at this scenic spot was cut short by a rare and gusty desert rainstorm. Continuing along the conference route, the party passed the shallow wells of the 47-year old San Juan Oil Field, and stopped briefly at the village of Mexican Hat.

Second camp site was in desert area with this view of Monument Valley.

At Mexican Hat, in southern Utah, the caravan prepares to cross San Juan River bridge into Navaho Indian Reservation.



Navaho Twins, strange rock formation left by erosion at Bluff, Utah, was examined with interest by members of tour party.

The caravan crossed the San Juan River at this point and entered the 25,000 square mile Reservation of the Navaho Indians. Skirting picturesque Monument Valley National Park, which at this time was almost obscured from view by blowing sand, the buses soon arrived at the site of the Vanadium Corporation of America's Monument Valley No. 2 Uranium Mine, in northeastern Arizona. Company officials explained the layout of the mine, one of the largest in the nation, and invited the visiting geologists into the diggings. This was a rare treat for most of the visitors, and few left without a sample of rich ore, chipped from the walls of the mine.

A few miles away the party pitched camp for the night amid the rocks and sand of Cane Valley. West of the camp site the towering spires of Monument Valley could be seen dramatically silhouetted against the blazing red skies of a desert sunset.

The Third Day

Heading east on the morning of the third day, the field conference caravan followed a rocky Arizona desert road toward the point of the Four Corners. The buses bounced their way across Comb Ridge, past occasional Indian hogans, and arrived shortly before noon at Boundary Butte, just over the line in Utah. This area was of particular interest to the petroleum geologists in the party because of recent oil activities here. Several wells have been drilled on the Boundary Butte anticline, and two of them are now producing oil. Some gas has also been discovered in this vicinity.

After lunch atop Boundary Butte, the caravan moved eastward again, passing the site of Humble's new wildcat test location at the foot of Red Mesa in northeastern Arizona. Cross-

Visit to uranium mine near Monument Valley was one of the most interesting events on second day of the field conference.

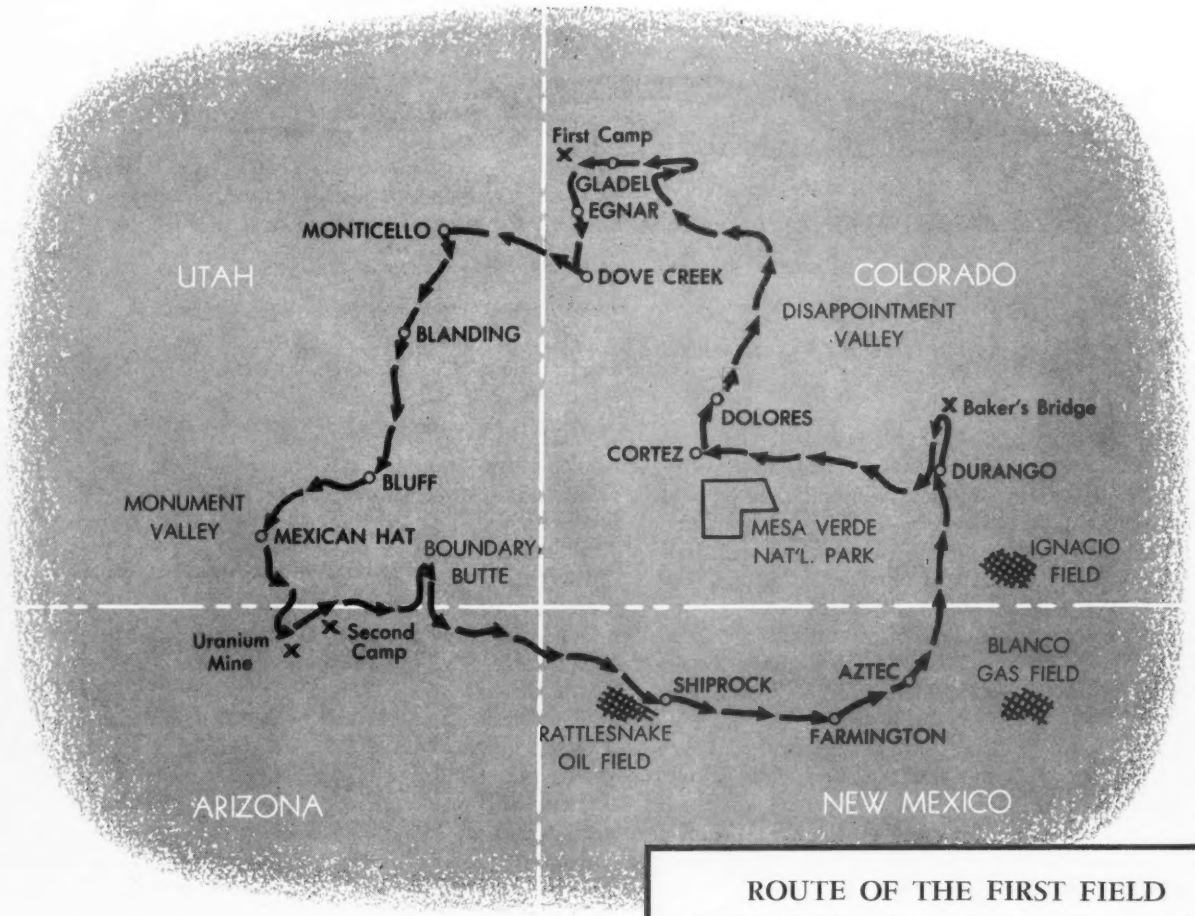
Near Shiprock, familiar landmark in northwestern New Mexico, the field conference party visited the Rattlesnake Oil Field.

ing the state line into New Mexico near the Four Corners, the party made a brief stop at the Rattlesnake Oil Field. This field lies near the base of the famous landmark known as the Shiprock, a mighty shaft of volcanic rock that juts incongruously out of the desert floor in the shape of a ship at sea.

From here the conference route followed paved highways along the San Juan River valley, through Farmington and the gas fields of northwestern New Mexico and southwestern Colorado. At dusk the caravan pulled into the Fiesta Grounds at Durango and the tour was completed.

Although the participants still may not see eye-to-eye on all the geologic theories discussed on the tour, there is one point on which they are in wholehearted accord: the first Four Corners Field Conference was an outstanding success.

Atop Boundary Butte, near the Utah-Arizona line, the members of the field conference party listen attentively to a discussion of the geology of that local area.



ROUTE OF THE FIRST FIELD CONFERENCE OF THE FOUR CORNERS GEOLOGICAL SOCIETY.

JANE LONG
Mother of Texas

The second and concluding installment in the story of a famous woman who accompanied her adventurous husband on an expedition to free Texas from Spain. Driven from Nacogdoches, General Long set out with his wife to establish a new base at Bolivar Point.

FOR Long, this trip to Bolivar Point lasted but a few days. After taking steps to organize the place and issuing a proclamation calling upon all his former companions to come to Bolivar and re-enroll, he set out with Jane and Major Hall for Alexandria. There the General and Jane picked up their daughter, Ann, and proceeded to New Orleans where Long proceeded with the business of re-organizing and outfitting his expedition. Jane and Ann boarded for a time in New Orleans before going to Rodney, Mississippi, where they stayed with a Mrs. Chesley, another sister of Jane's.

Long ran into trouble in New Orleans. Neither the Spanish nor the French would listen to his cause, and he had to depend wholly upon Americans for backing. And when that backing was found, it was advanced with the proviso that (for political reasons) the former Mexican revolutionary, Jose Felix Trespalacios, be placed in charge of the expedition. Long accepted. By this time he was too weary to quibble over leadership. He had made two new friends who agreed to go to Bolivar—Ben Milam and John Austin—and he took comfort in the support expected from them.

When the expedition was ready to sail from New Orleans, one passenger was late, and the sailing was delayed. Jane Long had not yet returned from the Chesleys. When she finally arrived, and the ships were at last bound downriver, Jane had a change of heart at English Turn. Here, Jane ordered the captain of *The Three Sisters* to turn back and drop her off again at New Orleans. Leaving Ann behind her this time had proved more than she could bear.

Reluctantly, we may imagine, the captain obeyed. Luckily, he was able to put Mrs. Long aboard a passing steamer and she was soon on her way back to Rodney to rejoin Ann. The expedition, freed of the encumbrance of a woman who changed her mind, was off again and reached Bolivar around the first of June in 1820. There Long (Trespalacios had not yet arrived) set up a government, established laws, made Galveston a port of entry, fought a battle with Indians, and managed to maintain discipline. He issued two interesting orders, one prohibiting profane swearing and the other abolishing corporal punishment in the Army.

But Jane proved that a woman can change her mind one way as well as another. The latter part of 1820 saw her

rejoining her husband at Calcasieu and returning with him to Bolivar. This time she brought with her Ann and Kian, as well as personal effects to make life at the fort as happy and homelike as possible.

Meanwhile, Trespalacios had joined his command at Bolivar only to return later to New Orleans with men of his company. Here, the former revolutionary was discovered and forced to go into hiding until Long could come to his rescue. Long and Trespalacios returned to Bolivar late in August. Soon after, Milam and Trespalacios left for Vera Cruz, where they were to contact Augustin de Iturbide and report back to Bolivar on the progress of the revolutionary movement in Mexico.

They were scarcely on their way to Vera Cruz before news came that La Bahia had issued declarations of independence. This, to Long, was a warning to act quickly. Independence was *his* business. If his army and he were to get any credit for freeing Texas, he had better get at once into action. He decided to leave immediately for Copano Bay, the jumping-off place for an assault on La Bahia.

Jane was in for another of those going-away arguments and parting kisses which had thus far marked her life with James Long. He refused to let her go with him, promising to be away only three weeks. Feeling no special apprehension about this parting, she let him go, promising to remain at the fort until his return. Another baby was due in December; she would have plenty to keep her busy and make this separation less painful than the others.

What actually took place at the fort after General Long left for La Bahia has been told many ways. Perhaps the best and most authentic account is told by Mirabeau B. Lamar, who later lived at Mrs. Long's boarding house, where he became a close friend and confidant. Here is his story, with only minor changes in punctuation, paragraphing, and sequence of material. No doubt what follows is exactly as Jane told it later to Lamar:

"Let us now return to Mrs. Long at Bolivar. When General Long departed for La Bahia taking 75 men with him, he left behind 50 soldiers to garrison the fort. They behaved well; everything went on properly at Bolivar; but not hearing anything from their commander General Long, they after a while became restless, not knowing what to do . . . the soldiers daily left the fort, scattering at various directions, some returning to New Orleans by way of Opelousas, some remaining in the country with the Indians.

"Mrs. Long was finally left alone at Bolivar, not a soldier, officer or any living being with her except a Negro girl 12 or 13 years old and her young daughter Ann. The soldiers staid (sic) in the fort as long as there was a morsel of provisions but when everything to eat was exhausted, they all departed . . . leaving for Mrs. Long not one solitary mouthful of anything whatever.

"They persuaded and plead with her to depart with them; but she said no; her husband had left her there and would expect on his return to find her there. They told her that he would in all probability never return, for not a word had been heard from him since his departure; but she still persisted in remaining even if she perished.

"In this situation she was left. There was more ammunition in the fort than they could carry off; and several muskets were also left . . . She shot birds, caught oysters, fish, etc., and they kept her from starving. Her last hook and line was finally lost and she had then to live on oysters, mainly. In this situation she had a daughter born, not a living soul to help her to food or any other assistance except the Negro girl above mentioned who was at the time sick and about to die apparently . . .

"The night her child was born (December 21, 1821) was the coldest ever known in Texas; the bay was frozen nearly a quarter of a mile, so that a person could walk on

The Redfish Incident *E. M. Schiwetz*

Brush with the Indians

the ice without cracking it; a circumstance never known before or since. That same night of birth the wind blew off the top of her house and it snowed in the house and on her bed during the parturition . . . Mrs. Long at this critical period was not only destitute of help but had to help her Negro, then arose the morning after the birth of her child to gather food for herself, child and Negro.

"During her stay she was frequently threatened by the Coronkaway Indians. They lived on the Island of Galveston, their fires were seen there; they several times came to the beach as if they were about to cross over to Bolivar; Mrs. Long having no flag, took her red-flannel frock and hoisted it a bloody banner, at the same time fired the cannon at them, whereupon they became alarmed and retired. This she had to repeat as often as danger threatened.

"When her child, born in the fort (Mary James Long) was five days old, a messenger arrived with a letter from her husband dated from Monterrey and brought by Rafail (Rafael) Gonzales, accompanied by a file of men. He remained two or three days and left.

"Mrs. Long remained in this desolate condition in the fort until the last of January, 1822, without ever seeing any living being except the hostile Karankaways when one morning her Negro girl who had been gathering wood, came running to her mistress announcing that she saw three men approaching. Mrs. Long, hastily slipping on her shoes, went out of the fort in great joy to meet them, when to her surprise the men fled. She pursued, calling on them to stop, but they soon left her out of sight after she had run about 2 miles.

"On her return back to the fort, she fortunately found a fishing line and hook; she had not eat (sic) anything for nearly 3 days; the circumstance was a very singular one. She had about 3 weeks previously been fishing and a large red-fish having hung himself to the hook drew Mrs. Long in the water. The line was fastened to her waist; she extricated it and the fish went down the beach, she watching him carrying off the last hook and line she had. The line she found on her return from the above pursuit was buried in the sand, one end sticking out; she caught it, and on pulling it drew out a large red-fish; and she doubted not but that it was the very line she had lost previously as it was not more than 3 hundred yards below the place where she lost it. This fish was the first food she had eaten in 3 days.

"About three or four days after the appearance of the three men, the Negro girl called to her mistress that five sail were approaching. One of the sail proved to be a small sloop with fifteen men aboard. The three who had made their previous appearance were of the number. They were among the first of Austin's emigrants; they had heard that the soldiers at Bolivar had all been taken prisoners so they were afraid to approach the fort. An old wreck of a vessel was near the fort, with great numbers of crows and other

E. M. Schiwetz

birds pirched upon it, which these emigrants mistook for Indians. They kept their distance.

"Mrs. Long finally came from the fort with her Negro girl and children to shew herself that the emigrants might approach . . . Two ventured first . . .

" 'You are Mrs. Long?' said one of them.

" 'Yes.'

" 'What have you to eat and how do you get it?'

" 'I have lived on birds until my ammunition became exhausted and now having recovered my hook and line I catch fish.'

" 'Then,' said one of the gentlemen, 'I will go to our vessel and bring you something.' He went and brought a little meal and other things, the first bread she had eat (sic) in many a day.

"The other man at the same time said, 'Well if there is a deer to be found in this prairie he would have one.' He had not been gone 20 minutes before he brought in a fine fat buck. That evening they, the little sloop with the 15 men, moored in the bay and sailed next morning up the San Jacinto. (The other four sail which made their appearance at the same time with this sloop, were bound to various points. One was wrecked on the Island of Galveston, one sailed for the Brazos, one for some other point, and one which was bound for Matamoros, having emigrants aboard destined for the San Jacinto, anchored at the Island . . .)

"When the little sloop sailed, she had not gone scarcely out of sight when a little peroque made its appearance upon the waters. It contained a Mr. Smith and all his worldly effects; he came from Quelqueshoo (Calcasieu) where Mrs. Long had once seen him. His family walked on the beach while he rowed the peroque. He . . . was surprised to find Mrs. Long there in her desolate condition.

" 'I am better off,' said the lady, 'than I have been for many a day, for I now have corn meal and venison.'

"Smith begged her to accompany him up the San Jacinto whither he was bound, but she declined, saying that she would remain at the fort until the return of her husband. 'Well then,' said Smith, 'you shall not remain alone; I will leave my daughter Peggy with you, and on my reaching my place of destination will send my boy James down with the boat with provisions for you.'

"His daughter Peggy was accordingly left with Mrs. Long. The next day the captain of the vessel on the Island landing the emigrants came in a small boat to Bolivar. He told Mrs. Long that he had read in a New Orleans paper that General Long would not be able to settle his business in Mexico and return short of twelve months; that his vessel was bound for Matamoras; that if she thought she could get to Mexico from that port, he would safely land her there and furnish her with money to prosecute her journey.

"After much debate she concluded to sail, provided he the Captain would send Miss Smith to her father, up the San Jacinto. This he accordingly done in his small boat. Mrs. Long went aboard the vessel, but the very next day another vessel arrived with emigrants and casting anchor close beside the one which she was in, she commenced conversation with some of them. Col. Pettus was of the number. He told her that he had also seen in a New Orleans paper that her husband would shortly sail from Mexico (city) to Vera Cruz on his way home.

"This at once made her abandon her Matamoras trip. She again went to Bolivar, and the small boat that took Miss Smith up the San Jacinto passed without meeting with Smith's boat which was at the same time descending with provisions for Mrs. Long. Smith's son James, about 15 years old, reached Bolivar and the next morning Mrs. Long bid adieu to the fort and went with James up the San Jacinto to Mr. Smith's, about 20 or 30 miles.

"She reached Smith's in March, April or may (sic) not recollected. The first information which Mrs. Long received of the fate of General Long was from a letter which she received from Abel Terrell, written at Refugio dated 8 July 1822:

> 'Painful as it may be to your feelings, I conceive it my duty to give you a plain & strait account of the untimely death of Gen. Long—He had been but ten days in Mexico when the circumstance took place.
> Genl. Long was well recd. in Mexico, & had recd. several visits together with many invitations from our English Col., one of which he was about to return, when he was hailed by a Centinel and ordered to stop, at the same time, Genl. Long put his hand to his side pocket, to draw a paper. (His Pasport) The Centinel supposing it to be for the purpose of drawing his side fire arms to defend himself, at which time the Centinel fired at Genl. Long; and the ball entered his side & pressed thro' him; he expired in a few minutes.

Arrival at the Alamo — *E. M. Schiwetz*

His death was much regretted by the inhabitants in general. The Congress have it in contemplation, as soon as they get through the hurry of business as respects the Govt., to make a hansome appropriation for yours & children & support . . .

Signed
Abil Terrill.' "

There were those, including Ben Milam and John Austin, who declared that Long's death was no accident or result of a misunderstanding by a sentry, but a conspiracy engineered by Trespalacios. Earlier at Bolivar, Long had disciplined a young man named Modello, secretary and protege of Trespalacios. On the surface, the Mexican revolutionary had not seemed to resent the disciplinary action (taken in his absence) but many thought he always held it against Long and waited for the proper time to take his revenge.

At any rate, whatever the reasons or intrigues might be to blame, Jane's beloved General was dead. She covered her grief as best she could and set resolutely to the task of living and caring for her family. She hired an old man to build her a cabin on a little bayou near Smith's and lived there until September.

On September 19, 1822, Jane set out for San Antonio in the company of two friends, Randal and James Jones. It was a memorable date for her, for the ill-fated General Long had left Bolivar for La Bahia on the same date exactly a year before. This time, Jane was on her way to San Antonio at the invitation of Trespalacios, now governor of the place, who had offered to supply her needs for money. With her she took Ann and the nine-months-old Mary James.

The first night out, they camped on the prairie. Game was so plentiful here that they spent nine days killing and drying meat for the trip ahead. As they were breaking camp, another letter arrived from Trespalacios, this time expressing the hope that Jane would arrive about the same time as his wife, who was joining him in San Antonio, and whom he had not seen since his imprisonment in Havana nine years before.

Nothing much of interest happened to the little band of travelers until they reached the Guadalupe. Near the river was a large lagoon, and the famished horses rushed up to it for water. As the party reached the lagoon, they discovered a large body of Karankawa Indians gathering up their horses on the prairie.

The naked and painted savages seized their bows and came running toward Jane's party with threatening attitudes. One Indian made an effort to take away a gun from Negro Tom, and the two Jones escorts prepared for battle.

Fortunately, the affair passed off without a fight. The Indians, still insulting and threatening, tried to get Jane's party to make camp with them for the night, but Jane wisely decided against it. Here is Lamar's account of a woman's decision that quite likely saved her life and that of her party.

"She crossed the river and camped on the other side. Jones wanted to go out to the prairie, where two Americans and two Mexicans were encamped, but she said no;

she would camp on the bank of the river because there was no other point at which the stream could be crossed without swimming, and she said if the Indians should attempt that night to cross, there was the point to give them battle. Accordingly they sent their horses to the prairie and pitched their camp immediately on the bank of the river."

It was not until after she reached La Bahia, some time later, that Mrs. Long heard that the two Americans had been murdered by the Indians and that the two Mexicans had narrowly escaped with their lives.

Mrs. Long remained three or four days at La Bahia on her way to San Antonio. She was well received, and a ball was given in her honor. Being in deep mourning for her husband, she refused to join in the dancing until a local priest insisted on the honor of dancing with her. This she could ill refuse, so history records that she made an exception and "danced with the Revd. Gentleman."

On the 14th of October, 1822, Jane left for San Antonio. After a three-day journey she stopped at the Alamo, then described as "a fort on the east side of the (San Antonio) River." Since Governor Trespalacios was not yet keeping house, Jane lived for three months in the home of Don Erasmo Seguin, an influential San Antonian whose son, Juan N. Seguin, was later to fight on the American side at San Jacinto.

The next day, Governor Trespalacios and his wife (who had just arrived in San Antonio) called on Jane. He expressed great regret at the tragic death of General Long, and offered to pay Randal and James Jones for bringing Jane to San Antonio. Nothing was said, however, about any money for Jane herself. All she ever got out of Trespalacios (besides promises) were her husband's arms and ammunition, taken from him when he was made prisoner in 1821.

Jane and her children found good friends in San Antonio, but the life was not to her liking. Turning down a chance to accompany the Trespalacios family to Monterrey, she left for the United States on August 6, 1823. She stopped first at her sister's home in Alexandria and six months later paid another visit to her other sister in Mississippi.

Tragedy seemed to pursue Jane. In June of 1824 she lost Mary James, the daughter born in the Bolivar fort. Later that year she moved to Texas with the Calvits, her sister and brother-in-law of Alexandria. December of 1825 found Jane and the Calvits at San Felipe, where they barely made a living. Friends felt that the Mexican Government should do something to help Jane, but no help ever came. There is evidence that she applied for a pension, but it was denied because Long, though a revolutionary against Spain, had never held a commission from Mexico. The government did, however, confer a grant of land upon her in 1827.

The year 1828 still found Jane at San Felipe, a rather remarkable 30-year-old widow whose charm and wit were as widely known and admired as her great courage. A good description of Jane at that age is given by a friend:

> "In person, she is tall . . . a beautiful figure . . . moving with a grace that is truly and wholly feminine—her countenance . . . is highly interesting—her features are regular—her aspect smiling—her eyes sparkling, her tongue not to (sic) pliant for a female . . . very engaging in all her conversations . . . a gay widow of about 35 she is agreeable where and when and as the manner and disposition of her company requires."

Jane sent her daughter Ann back to school in Natchez in 1830. In 1832 she opened in Brazoria the boarding house which became famous in Texas history for its social functions and the caliber of its clientele. For five years she ran the boarding house, she and Kian doing all the work. During this time she found herself taking part in high-level political intrigues, reigning as the center of social attraction, and taking in such famous "boarders" as David Burnet, Sam Houston, and Mirabeau B. Lamar, the first three presidents of the Texas Republic. Gossip had it that both Houston and Lamar asked her to marry them. Certainly there is good evidence for Lamar's case in a poem he wrote "To Bonnie Jane."

> "The moon, the cold, chaste moon, my love,
> Is riding in the sky
> And like a bridal veil, my love,
> The clouds are floating by.
> Oh, brighter than that planet, love,
> Thy face appears to me;
> But when shall I behold its light,
> Through bridal drapery?
>
> We owe our gratitude, my love,
> To Sol's enlivening ray;
> And yet I prize the moonlight, love,
> Above the glare of day.
> O bonnie Jane, thou art to me
> Whate'er in both is best—
> Thou art the moonbeam to mine eye,
> The sunbeam to my breast."

For a soldier and a politician, that is pretty good poetry. Certainly it showed that Lamar fancied himself something more than a mere boarder at Jane's place—or at least wished to be more. Jane, though, never re-married. The dashing Ben Milam was at one time reported to be engaged to her, but fate took a hand in that when Ben was killed in 1835 in the assault on San Antonio.

In 1837, at the age of 39, Jane moved to her land grant at Richmond. Here she bought a slave and began farming. With good business sense and hard work, she managed her affairs so well that her plantation prospered and she never again knew the pinch of poverty. She paid off all her husband's debts and by 1850 her plantation was among the most valuable in Texas. In 1870, she lost her daughter Ann, her only child who lived to adulthood.

In 1880, the great lady who had already become known as "The Mother of Texas" died at her place in Richmond. Never in her 82 years had she ever lost her courage, her love of life, and her sense of humor.

The HUMBLE WAY is indebted to Anne Ammons Brindley, of Galveston, for much of the material in the Jane Long story, the first part of which appeared in the May-June issue.

Mrs. Brindley's article was first published in the Southwestern Historical Quarterly for October, 1952, and followed more than two years' research work, much of it in original sources. The resultant article provided this highly interesting footnote to the colorful history of Texas.

Oil Progress Week Set For October

October 9 to 15 will be Oil Progress Week—a period set aside for telling our neighbors about the oil industry and its contribution to the community.

Whatever your job in the industry, your neighbors think of you as a spokesman for the oil business. They may ask you some pretty important questions.

Here are some samples of the most frequently asked questions with the answers given briefly.*

Are you running out of oil?

No, our known underground reserves are higher than ever before—nearly 33 billion barrels. Strenuous effort is necessary, however, to keep pace with increasing demands for petroleum. Too, it is becoming more expensive to replace the oil we produce.

Is the oil industry a "monopoly?"

Certainly not; there are 42,000 oil companies and nearly 200,000 service stations, many in direct competition with each other.

Can private management meet future oil needs?

The answer to the future lies in the past record. Private management has brought the American oil industry to the highest level reached by any oil industry in any country—including those that are government-operated. Under private management, initiative and competition provide a driving force totally lacking under government monopoly or state ownership.

Aren't all brands of gasoline the same?

No. Each company strives constantly to improve its products, and when it succeeds, others try to equal or surpass the improvement. There are hundreds of brands of gasoline on the market today, each with different characteristics. Of course, different gasolines have similar qualities—if not it would be necessary to design a different engine for each one.

What is the "OIIC?"

The OIIC is the Oil Industry Information Committee—the public relations branch of the American Petroleum Institute. It is composed of men and women throughout the petroleum industry who have joined to tell the American people about the oil business.

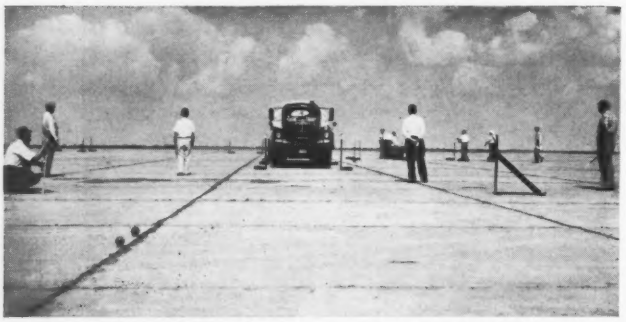
As you know, Oil Progress Week, sponsored by the OIIC and its members, has become an annual affair across the nation. The Humble Companies and Humble people have taken part in this joint industry endeavor since its inception in 1946.

Because they believe in the sound principles of this program, the Companies will continue to take an aggressive part and encourage Humble people to participate to the extent permissible with the normal conduct of Company business.

With your help, Oil Progress Week can be made a real contribution to the industry and to the Humble Companies.

*Questions and answers from OIIC pamphlet "Do You Know the Answers?"

R. W. BOSWELL WINS HONORS IN ROADEO



Driver runs Roadeo obstacle course as judges watch.

R. W. Boswell, transport truck driver of Houston, hauled away top honors for the second time in the Company's sixth annual Roadeo, held at Galveston June 20. He won his first championship in the transport division in 1953 at Tyler during one of the wettest days in that town's history.

At Galveston he had fine weather this year, and he took the course first to set a pace none other was able to beat.

H. R. Bridges, driver from Waco Terminal, won the bobtail event to give Waco its third straight championship. Gene Romine won the bobtail event in 1953; W. H. Knight won last year's transport championship.

EMPLOYEES RETURNED FROM MILITARY SERVICE

AIR FORCE—Charles F. Parr, Petroleum Engineering in Houston.

ARMY—Earl O. Andrews, Leon A. Konvicka, and George L. Webb, Katy Gas Cycling Plant; Hinson M. Barfield, Goose Creek Production; Bobby D. Birmingham, Sales Accounting in Houston; Marvin E. Brown, Colorado Production; Albert R. Gage, Maurbro Production; Carlos R. Lafayette and Ivy R. Ringo, Conroe Production; Carl N. Odom, Jr., Geologic-Texas; Milton E. Perry, Lovell Lake Production; Ivy J. Redmond, Jr., Grand Isle Production; James W. Thomas, Baytown Refinery; Elmo S. Walker, Geophysics Shops, Houston; Glyn C. Willborg, Humble Pipe Line Accounting, Houston.

EMPLOYEES CALLED TO MILITARY SERVICE

AIR FORCE—Hollie L. Briscoe, Jr., Baytown Refinery; Robert P. Vernon, North Texas Division Office.

ARMY—Hugh R. Baker, Geologic, Florida; Rodney N. Ferguson, Stationery & Reproduction; Tillotson B. Field, Jr., Gulf Coast Division Office; George C. Kunkel, West Texas Division Office; Samuel E. Loy, III, Athens Production; Robert L. Murray, Stratton Production; Kenneth L. Nall, Baytown Refinery; Bobby L. Sledge, Talco Production.

NAVY—John M. Hatchett, Geologic Research, Houston.

REX BAKER RECEIVES CHAMBER OF COMMERCE POST

Rex G. Baker, Vice President and General Counsel for Humble Oil & Refining Company has been appointed to the United States Chamber of Commerce Committee on Natural Resources.

This committee studies and reports to the U. S. Chamber of Commerce on trends and developments in forestry, mining, water resources, electric power, and oil and gas. Mr. Baker's services will be directed primarily to matters on oil and gas, a field in which he has devoted a long career and attained a wide knowledge.

CHANGES ANNOUNCED

The Annuities and Benefits Division recently announced changes in the Group Hospitalization and Surgical Benefits Insurance Plan to provide coverage for dependent children 19 but less than 24 years of age.

Covered dependents of participating employees or annuitants reaching age 19 on or after July 1, 1955, become eligible for coverage under this provision on the first day of the month following the day they become 19.

Application must be made on a form provided by the Company and within 31 days after date of eligibility.

The A & B announcement pointed out that "If application is not made within 31 days after date of eligibility or if the dependent was not insured at the time he reached age 19, coverage will be postponed for six months from date of application and evidence of insurability satisfactory to the insurance company will be required."

Cost of the insurance will be $2.65 a month ($2.75 in the Baytown Plan) for each covered dependent 19 through 23 years of age. This premium to be paid by the participants is in addition to premium they pay for themselves and other covered dependents. The coverage is optional.

1000th LIVING ANNUITANT

Drew V. King, 65, Cracking Coils at Baytown Refinery, was the 1000th living annuitant on his retirement July 22. He is shown (left) with his son, Dean, who is employed at the Refinery's Service Laboratories.

Mr. King started with Humble in the Rigging Department in 1929. Later the same year, he moved to the Cracking Coil Department. He was an operator at the Flash Correctors at the time of his retirement.

Recent Retirements

HUMBLE PIPE LINE COMPANY

Name	Location	Date of Retirement	Years of Service
Frank L. Clements, Jr.	Hull	August 6	34
Luther P. Strickland	Odessa	June 21	29
Willie E. Thomas	Odessa	July 30	31
PRODUCTION DEPARTMENT			
Elbert W. Howell	Goose Creek	August 1	30
Melville A. Loucks	East Tex. Div.	August 15	22
Robert S. May	Imogene	August 13	26
Woodie R. Powell	Eucutta	June 18	31
BAYTOWN REFINERY			
Max L. Ackerman	Experimental & Testing Div.	July 28	26
Levoy O. Andrews	Service Lab.	March 1	18
Floyd Brinkley	Distillation	June 1	28
Garrett C. Cauthen	Light Oil Treaters	July 1	31
Iredell D. Cowan	Crude & ReRun Distillation	July 1	31
Ollie J. Day	Pipe Dept.	July 3	31
Arley O. Dunaway	Distillation	August 1	27
Tyne A. Gregory	Treating Dept.	August 1	33
Oscar H. Hunter	Distillation	June 30	20
Jasper H. Jones	Pumping & Gauging	August 1	30
Drew V. King	Cracking Coils	July 22	26
Jesse J. Koch	Labor	July 7	27
Dave Martin, Jr.	Lead Burners & Pump Repairers Dept.	July 1	31
James S. Nettles	Distillation	July 1	28
Robert R. Porter	Distillation	June 1	29
Alexander Pursley	Watchman-Plant Protection-Dept.	July 6	30
Guy D. Richardson	Distillation	July 1	30
Paige Byron Stone	Machinist Dept.	June 24	24
Kenneth Taylor	Light Oil Treaters Dept.	August 9	38
James P. Wood	Compound Dept.	July 1	34
HOUSTON OFFICE			
Jessie L. Belcher	Sales Accounting	June 17	25

Deaths

Employees: James F. Ball, 58, stencil designer at Baytown Refinery, on June 25; Cothridge E. Crews, 59, telegraph operator at Ingleside Station, on June 4; Walter W. Day, 62, lease pumper-gauger at Gladewater, on July 9; Lloyd H. Gates, 52, geophysics supervisor in Geophysics Exploration-Texas, on June 26; Paul S. Hendry, 57, assistant chief dispatcher in the Houston Office, on July 9; Aaron M. Lucus, 56, porter at Gladewater, on July 1.

Manse Y. Randolph, 52, technical specialist in the Houston Office, on June 21; Burnell A. Treadwell, 44, janitor in the Houston Office, on June 15; Onis D. Welch, 50, lease pumper-gauger at Talco, on July 3; William P. Wright, Jr., 26, truck and tractor driver at Imogene, on June 19.

Annuitants: Maceo Green, 52, former laborer at Baytown Refinery, on June 24; Jake Hodges, 73, former laborer at Baytown Refinery, on July 5; James M. McLeroy, 62, former field gauger at Longview, on June 27; James O. Robertson, Sr., 65, former machinist second at Baytown Refinery, on June 26; William R. Schrock, 73, former handyman at Baytown Refinery, on June 12; Mitchell J. Woody, 65, former gas plant engineer first at Clear Lake Gas Plant, on June 12.

Behind this issue

• A writer-photographer team arrived on Lake Casa Blanca, near Laredo, at one of those "bad times" which invariably afflicts the amateur angler. Winds were brisk but hot, and bass remained sulkily indisposed. Things looked bad, and it appeared for a time that the story on Texas inland lakes would be hard pressed for a fishing picture.

Then Gene Whittenburg, well-known Laredo sportsman, came to the rescue. Taking his boat far up into the weedy and brushy narrows of the lake, Gene proceeded to demonstrate his skill before the camera lens. An expert who had fished his way from Canada to Mexico was not going to let THE HUMBLE WAY down!

The string of fine bass Gene holds in the photograph was **not** caught on this occasion, more's the pity. But it does show the kind of fishing that Lake Casa Blanca produces in one of its better moods.

• Staff photographer Mel Coston had to go through a dusty ordeal to get the color pictures of the Four Corners Field Conference (pages 10-15).

Traveling in a car which followed the caravan of buses, Coston spent much of his time engulfed in a cloud of dust. First, desert sand clogged the delicate mechanisms of his cameras. Then the glass viewing prism in one of the cameras was shaken loose from its mountings by the constant bumping and jostling as the car labored over the crude roads. Coston complained, yes—but not about the dust on the roads. His complaint was that there wasn't enough room in the car to take along his large camera and a tripod. Now he wants to go back.

Incidentally, any geologist who missed the Four Corners Conference can easily take the same tour in his own car and see everything the members of the party saw. All he has to do is get his hands on one of the excellent guide books prepared for the tour by members of the Four Corners Society. In addition to the numerous technical papers, the 230-page guide book contains a detailed road log covering the entire route. Notes on this log describe everything of geological interest, and give complete instructions to the driver. Sample entry: "Slow down, hill. Be cautious of ore trucks during all of this trip. The drivers of these trucks care little for life or limb."

• When gathering information for the story on page 1 about the Van de Graaff Accelerator, a staff writer naturally asked a lot of questions about the safety hazards involved in the work. Well, he was told, the folks at Baytown Refinery whose job it is to see that working conditions are safe certainly took a hard look at the building which houses the accelerator. On an appointed day not long after the machine was installed, a safety committee was received. Committeemen inspected with care the many safety features—the gongs which sound when power is applied, the red lights which come on when doors are opened and closed, the radiation monitors, the thick walls, the lead brick shielding. All seemed safe enough.

Then they had a look at the tunnel which provides an emergency escape route from the radiation pit. There they found a definite safety hazard, one which the men who work in the building did not take lightly. Making a home in the darkness of the tunnel was a black widow spider.

The Humble Way

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HUMBLE OIL & REFINING COMPANY

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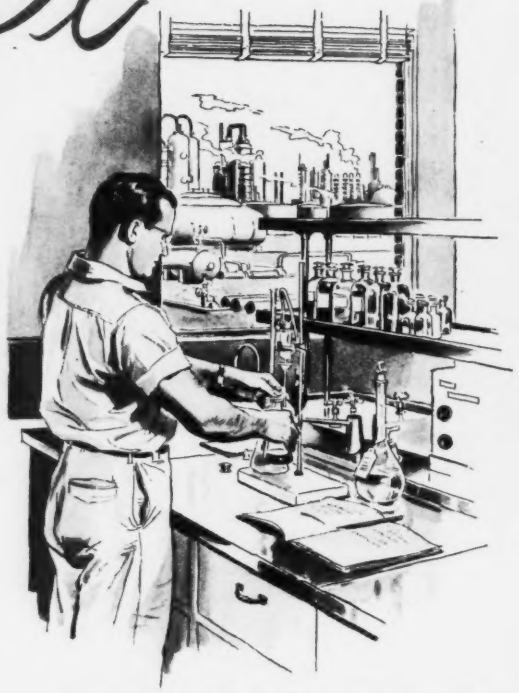
Stately rocks of Monument Valley National Park, an attraction to tourists, are familiar landmarks to geologists in Four Corners Area. (See pages 10-15.)

Going Places



Young scientists who select careers in the petroleum industry are going places in more ways than one. First, financially, for the pay is good; second, professionally, for the opportunities are limitless and the satisfactions are real.

Here are just a few facts that will show you the enormous job the industry has done and has yet to do. They will show you, too, why the petroleum industry must have, and is willing to pay well for, the best "brains" obtainable:

- *A fourth of the money spent on research by all industry in this country is being spent by the petroleum industry*
- *The petroleum industry supplies sixty per cent of the nation's energy requirements*
- *Seventy per cent of America's organic chemical output is derived from oil and natural gas*
- *Petroleum hydrocarbons can be arranged in 500,000 compounds, all available for development by the petrochemical industry*

The search for oil, drilling of wells, production, manufacturing, and research—all require increasing numbers of young men with engineering and scientific educations. Those who avail themselves of the opportunities in this vital industry can look ahead with confidence; they are the men who are going places!

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The Humble Company carries on exploration work in nine states . . . Alabama, Arizona, California, Florida, Georgia, Louisiana, Mississippi, New Mexico, and Texas . . . wells drilled by Humble total 900-1000 annually . . . crude oil production averages more than 350,000 barrels daily . . . refining capacity of 280,000 barrels of oil daily is centered at Baytown, Texas . . . retail sales activities are confined to Texas and New Mexico. Humble is the leading Texas marketer.

Humble Pipe Line Company operates about 9,500 miles of crude oil and product pipe lines in Texas and New Mexico and is capable of transporting about 750,000 barrels per day of crude oil and finished products.